Amendment to the Specification

A copy of the amended specification reflecting the corrections made to the claims is shown below.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a hinge for a portable device such as a mobile phone, a notebook computer, or a PDA (Personal Digital Assistant), and more particularly to a dual-directional hinge which can be rotated about a horizontal pintle and a ~~vertical axle~~ vertical pin

2. Description of Related Art

A portable device such as a mobile phone, a notebook computer or a PDA (Personal Digital Assistant) generally has a body and a monitor (or panel) pivotally mounted on the body by a hinge.

~~By~~ With the conventional hinge, the monitor can be turned about only a horizontal axis to change the vertical viewing angle, and cannot be turned left or right to change the horizontal viewing angle.

Therefore, the invention provides a dual-directional hinge to mitigate or obviate the aforementioned problems.

SUMMARY OF THE INVENTION

The main objective of the present invention is to provide a dual directional hinge which can be turned about a horizontal axis and a vertical axis.

Other objectives, advantages and novel features of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a dual-directional hinge in accordance with the present invention;

Fig. 2 is an exploded perspective view of the dual-directional hinge in Fig. 1;

Fig. 3 is a front ~~plan~~ view of the dual-directional hinge in Fig. 1

Fig. 4 is an ~~schematic~~ operational perspective view of ~~a portable device assembled with~~ the dual-directional hinge in Fig. 1 installed on a portable device;

Fig. 5 is a side ~~plan~~-view of the dual-directional hinge in Fig. 1;

Fig. 6 is an operational side ~~plan~~ view of the dual-directional hinge in Fig. 5 being turned about a horizontal pintle;

Fig. 7 is a top ~~plan~~ view of the dual-directional hinge in Fig. 1; and

Fig. 8 is an operational top ~~plan~~ view of the dual-directional hinge in Fig 7 being turned about a vertical axle vertical pin.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to Figs. 1-4, a dual-directional hinge in accordance with the present invention can be ~~assembled~~ used in a portable device with a body (20) and a monitor (60), such as a mobile phone, a notebook or a PDA.

The hinge has an L-shaped first supporting member (10) ~~being~~ composed of a first upright arm (not numbered) and a first lateral arm (not numbered) perpendicular to the first upright arm. The first supporting member (10) is mounted under the monitor (60) of the portable device. A non-circular opening (11) is defined through the first lateral arm of the first supporting member (10). A first positioning lug (12) and a second positioning lug (13) are symmetrically formed at two diametrically opposite sides of the non-circular

opening (11).

An L-shaped second supporting member (40) ~~being~~ composed of a second upright arm (not numbered) and a second lateral arm (not numbered) perpendicular to the second upright arm is rotatably mounted on the body (20) of the portable device and on the first supporting member (10). A circular opening (41) is defined through the second lateral arm and aligned with the first non-circular opening (11). The second lateral arm further has two detents (42) ~~respectively~~ defined ~~at~~ respectively in and protruding radially out from two diametrically opposite sides of the circular opening (41) and in communication with the circular opening (41). A third positioning lug (43) is formed outside the circular opening (41) and aligned with the second positioning lug (13) on the first supporting member (10). A tube (44) is horizontally and rotatably inserted in the second upright arm and mounted on the body (20) of the portable device.

A ~~vertical axle~~ vertical pin (30) with a non-circular cross section corresponding to the non-circular opening (11) is inserted through the non- circular opening (11) and circular opening (41) to rotatably install the second supporting member (40) on the first supporting member (10). A first washer (31) is ~~provided outside~~ mounted around the ~~vertical axle~~ vertical pin (30) and between the first supporting member (10) and second supporting member (40).

A ~~first collar~~ C-clip (49) is fastened at a distal end of the ~~vertical axle~~ vertical pin (30) away from the first supporting member. A first resilient member (48) is ~~provided outside~~ mounted around the ~~vertical axle~~ vertical pin (30) and between the ~~first collar~~ C-clip (49) and the second supporting member (40). A positioning ring (45) is ~~received in~~ mounted adjacent to the circular opening (41) ~~and provided outside~~ around the ~~vertical axle~~ vertical pin (30); and has an external edge and two protrusions (46) formed at two diametrically opposite sides of ~~an~~ the external edge of the positioning ring and selectively engaging ~~circumference thereof and respectively located in the apertures~~ detents (42). A first resilient member (48) is ~~provided outside~~ mounted around the ~~vertical axle~~ vertical pin (30) ~~and~~ between the ~~first collar~~ C-clip (49) and the positioning ring (45), and a second washer (47) is mounted around the vertical pin (30) ~~provided~~ between the first resilient member (48) and the positioning ring (45).

An L-shaped seat (50)~~; being~~ composed of a third upright arm and a third lateral arm[[;]] is mounted at a free end of the second lateral arm of the second supporting member (40). ~~A circular hole (51) is defined through~~ The third upright arm of the seat (50) has a front side, a rear side, a circular hole (51) and two notches (52). The circular hole (51) is defined through the third upright arm of the seat (50), and the two notches (52) are ~~respectively~~ defined respectively at a front side and a rear side of the third upright arm of the seat (50).

A horizontal pintle (53) has a first part (not numbered), a second part and a flange. ~~extending through the circular hole (51) of the seat (50), a second part (not numbered) secured in the body (20) of the portable device, and a flange (numbered) formed between the first part and the second part~~ The first part of the horizontal pintle (53) extends through the circular hole (51) of the seat and has a distal end, a circular shaft (55) and a non-circular shaft (54). The circular shaft (55) has a diameter and is formed at ~~a~~ the distal end. ~~thereof and a~~ The non-circular shaft (54) has a diameter and is formed between the circular shaft (55) and the flange.~~, wherein a~~ The diameter of the circular shaft is smaller than ~~that~~ the diameter of the non-circular shaft (54), and the non-circular shaft (54) is ~~received~~ mounted in the circular hole (51) of the third upright arm of the seat (50). The second part is secured in the body (20) of the portable device, and the flange is formed between the first part and the second part.

A ~~second collar~~ shaft clip (584) is fastened on the circular shaft (55). A third washer (56), a positioning disk (58), a second resilient member (582), and a fourth washer (583) are in turn ~~provided~~ mounted between the third upright arm and the ~~second collar~~ shaft clip (584). The third washer (56) has a surface facing the positioning disk (58), two ears (57) ~~respectively~~ located respectively in the notches (52) and two ~~domes~~ protrusions (561) formed ~~at a~~ in the surface facing the positioning disk (58). The positioning disk (58) is ~~provided outside~~ mounted around the non-circular shaft (54) for turning along with the horizontal pintle (53)[[;]] and has multiple ~~recesses~~ detents (581) ~~for positioning~~ to hold the ~~domes~~ protrusions (561) on the third washer (56).

With reference to Figs. 4-6, when a user raises the monitor (60), the second supporting member (40) along with the first supporting member (10) is rotated about the tube (44), and the seat (50) is rotated about the horizontal pintle (53), so the monitor (60) is turned about a horizontal axis extending through the tube (44) and the horizontal pintle (53). When the monitor (60) is in a certain position such as a vertical position, the ~~domes~~ protrusions (561) of the third washer (56) can be located in the corresponding ~~recesses~~ detents (581) to ~~position~~ hold the monitor (60) in position.

With reference to Figs. 4, 7 and 8, ~~in the raised situation,~~ when the monitor (60) is in the raised situation and is turned horizontally ~~turned~~ about the ~~vertical axle~~ vertical pin (30), the first supporting member (10) along with the ~~vertical axle~~ vertical pin is rotated about the second supporting member (40) and the seat (50) until the third positioning lug (43) abuts the first positioning lug (12) or the second positioning lug (13). Therefore, the horizontal viewing angle of the monitor (60) is changed.

~~It is to be understood, however that e~~Even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only. ~~and~~ ~~e~~Changes may be made in detail, especially in matters of shape, size, and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.